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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,706	06/04/2001	Sridhar Gollamudi	3	4965

7590

08/18/2004

Docket Administrator (Room 3C-512),
Lucent Technologies Inc.
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EXAMINER

PERILLA, JASON M

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/873,706

Applicant(s)

GOLLAMUDI, SRIDHAR

Examiner

Jason M Perilla

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2-6/01 3-11/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-13 are pending in the instant application.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on June 4, 2001 (paper no. 2 in the file) and November 17, 2003 (paper no. 3 in the file) are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Specification

3. The first paragraph of the body of the disclosure should be updated with the application number and filing date of the related application.

Drawings

4. This application lacks a clearly legible set of drawings. The Examiner notes that the block diagram of figure 2 has words that are nearly illegible in blocks 86 and 88. It is suggested that replacement sheets are submitted by the Applicant.

Claim Objections

5. Claims 1-13 are objected to because of the following informalities:

Regarding claim 1, it is suggested by the examiner that "selecting at least one of orthogonal coding and beamforming for transmitting" in line 6 is replaced by --selecting one of orthogonal coding or beamforming for transmitting— for clarity of the claim language. Further, claim 6 should be amended accordingly.

Regarding claim 5, "between received signals" in line 3 should be replaced by --between the received signals--.

Regarding claim 6, "the transmitting signal" in line 4 should be replaced by – transmitting signals--.

Regarding claim 7, "wherein the first level" in line 1 should be replaced by – wherein the at least one correlation coefficient being substantially equal to the first level— to provide consistency in the claim language.

Regarding claim 8, "coefficient between" in line 2 should be replaced by – coefficient having a level between— clarity of the claim language.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 4, the claim is indefinite because of the use of the term "estimated". The limitation including that the phase correlation coefficient is estimated is not definite because it has several interpretations. Further, one skilled in the art is unable to determine the particular method by which the phase correlation coefficient should be estimated.

Regarding claim 5, the claim is indefinite because of the use of the term "correlation". One skilled in the art is unable to clearly determine which correlation

between the received signals should be used to determine the at least one correlation coefficient. The term correlation is too vague to allow for a definite interpretation.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 2, 5, and 6-13 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Harrison (US 6154485 – cited in IDS).

Regarding claim 1, Harrison discloses a method of transmitting signals from at least two antennae (fig. 1; refs. 112, and 118) comprising the steps of: determining at least one correlation coefficient (α ; col. 7, lines 50-52) between received signals from the at least two antennae (fig. 1, refs. 116 and 118; col. 5, line 65-col. 6, line 6); and in response to the at least one determined correlation coefficient selecting at least one of orthogonal coding and beamforming for transmitting signals using the at least two antennae (fig. 5; col. 8, lines 4-35). The adaptive beamforming correlation coefficient α utilized in figure 5 is the equivalent to the adaptive array filter weights 90 and 92 which are utilized in the embodiment of figure 1. Further, the adaptive array filter weights 90 and 92 of figure 1 are calculated between received signals from the at least two antenna

in response to channel feedback from the receiver (fig. 1, ref. 149; col. 5, line 65-col. 6, line 6).

Regarding claim 2, Harrison discloses the limitations of claim 1 as applied above. Further, Harrison discloses the step of determining at least one correlation coefficient between the received signals comprises determining at least one amplitude correlation coefficient (fig. 5). The coefficient α of figure 5 determines the amplitude correlation of the various input signals for transmission (fig. 5, refs. 72 and 74) to the various antenna by the weight multipliers (fig. 5, refs. 172 and 176) by the function $(1 - \alpha^2)^{1/2}$. Therefore, the correlation coefficient determines at least one amplitude correlation coefficient.

Regarding claim 5, Harrison discloses the limitations of claim 1 as applied above. Further, it is inherent in the method of Harrison that the step of determining at least one correlation coefficient (fig. 1, ref. 149; col. 5, line 65-col. 6, line 6) comprises determining at least one correlation between received signals. The correlation coefficient α is utilized to determine the adaptive beamforming weights among transmission signals (fig. 5, refs. 72 and 74). Because traffic channel data is received and measurements and calculations are performed on the received signals and the channel data to determine the correlation coefficient (col. 5, line 65-col. 6, line 6), it is inherent that the determination of the correlation coefficient is determined according to at least one correlation between received signals.

Regarding claim 6, Harrison discloses the limitations of claim 1 as applied above. Further, Harrison discloses that the step of selecting at least one of orthogonal coding

or beamforming comprises selecting a proportion of orthogonal coding relative to a proportion of beamforming of the transmitting signals (col. 8, lines 4-35).

Regarding claim 7, Harrison discloses the limitations of claim 6 as applied above. Further, Harrison discloses that the at least one correlation coefficient varies between a first level and a second level (col. 7, lines 59-61).

Regarding claim 13, Harrison discloses the limitations of claim 7 as applied above. Further, Harrison discloses that the at least one correlation coefficient being substantially equal to the first level results in selecting beamforming for transmitting and wherein the at least one correlation coefficient being substantially equal to the second level results in selection orthogonal coding for transmitting (col. 8, lines 4-35).

Regarding claim 8, Harrison discloses the limitations of claim 13 as applied above. Further, Harrison discloses that the at least one correlation coefficient having a level between the first and second levels results in selecting both beamforming and orthogonal coding for transmitting (col. 8, lines 22-35).

Regarding claim 9, Harrison discloses the limitations of claim 13 as applied above. Further, Harrison discloses that the at least one correlation coefficient determines the proportion of beamforming relative to orthogonal coding used for transmitting (col. 8, lines 4-35).

Regarding claim 10, Harrison discloses the limitations of claim 9 as applied above. Further, Harrison discloses that the at least one correlation coefficient being at a level that is closer to the first level results in transmitting more beamforming than orthogonal coding (col. 8, lines 4-35).

Regarding claim 11, Harrison discloses the limitations of claim 9 as applied above. Further, Harrison discloses that the at least one correlation coefficient being at a level that is closer to the second level results in transmitting using more orthogonal than beamforming (col. 8, lines 4-35).

Regarding claim 12, Harrison discloses the limitations of claim 9 as applied above. Further, Harrison discloses that the at least one correlation coefficient relative to the first and second reference levels determines the relative amounts of beamforming relative to orthogonal coding used for transmitting (col. 8, lines 4-35).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrison in view of Forssen et al (US 6173014; hereafter "Forssen").

Regarding claim 3, Harrison discloses the limitations of claim 1 as applied above. Harrison discloses determining at least one correlation coefficient, but does not disclose that the step of determining at least one correlation coefficient comprises determining at least one phase correlation coefficient. The correlation coefficient of Harrison, α , is used to control the relative amount of beamforming to orthogonal coding used in the transmission (col. 8, lines 4-35). It is purely a real value having amplitude but not phase correspondence. However, one skilled in the art is familiar with adaptive beamforming

and the use of phase adjustments applied to signals for the various antenna facets used in the transmission of a beamformed signal. Forssen teaches an adaptive beamforming system (fig. 4). Forssen also discloses that various phase shifts are made to the signals being applied to the various antenna facets to create a beam (col. 5, line 60-col. 6, line 17; col. 6, lines 4-6). Thereby, with the use of amplitude *and phase* information applied to the various signals transmitted to create a beam, the downlink carrier-to-interference ratio is improved. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to determine a phase correlation coefficient as taught by Forssen in the method of Harrison because the phase information can be advantageously utilized to create the adaptive beam which results in a lower carrier-to-interference ratio on the downlink.

Regarding claim 4, Harrison in view of Forssen disclose the limitations of claim 3 as applied above. Further, it is inherent that the at least one phase correlation coefficient α of figure 5 is estimated because it is generated from the channel feedback (fig. 1, ref. 149; col. 5, line 65-col. 6, line 6).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art not relied upon above is cited to further show the state of the art with respect to orthogonal coding and adaptive beamforming.

U.S. Pat. No. 6317410 to Allpress et al.

U.S. Pat. No. 6661856 to Calderbank et al.

U.S. Pat. No. 6587515 to Jafarkhani et al.

U.S. Pat. No. 6754286 to Hottinen et al.

U.S. Pat. No. 6178196 to Naguib et al.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (703) 305-0374. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason M. Perilla
August 5, 2004

jmp



CHIEH M. FAN
PRIMARY EXAMINER